The WOOD DUCK

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HAMILTON NATURALISTS' CLUB

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The Hamilton Naturalists' Club promotes public interest in the study, conservation and appreciation of our natural heritage. Meetings are held monthly from September to May inclusive and visitors are always welcome. Outdoor field events are scheduled for every month, and a complete listing of the entire season may be obtained from the membership secretary.

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A WORD FROM THE PRESIDENT

Though the snow is piled several feet deep on my front lawn, the sound of crows calling this morning (Feb. 8) and the lengthening of the days are welcome signs that spring is just around the corner. By the time this issue is delivered to you I hope that many more signs of spring will be visible and that you are getting out to enjoy them.

Re Board of Directors

It is with great pleasure that I am able to announce that Bill Crins has consented to come on the board as Programme Director. This brings our numbers up to the required 12 members. We sincerely thank Bill for offering to act in this capacity and hope that he will find that working behind the scenes for the H.N.C. is both interesting and stimulating as well as challenging.

Don't miss the March indoor meeting. Betty Le Warne and Evely Morris will be on hand to greet you.

Hazel Broker

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WELCOME TO THESE NEW MEMBERS

Bill Copeland, 28 Sandalwood Avenue, Hamilton L8T 2E3

Adam Harrington, 1272 Truland Street, Burlington L7R 3T6

June Hocey, 307 William Street, Oakville L6J 1E5

Tema Klein, 817 Glenwood Avenue, Burlington L7T 2S8

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FIELD EVENTS — MARCH/APRIL/82 — FIELD EVENTS

SATURDAY, FEBRUARY 27, 1982 6:00 a.m.

Rise early and "PROWL FOR OWLS". Meet at the Dominion Store Parking area, east side of Hwy#2 just past Fidler's Green Road, Ancaster. Dress warmly for this morning only outing and be prepared to walk.
Leader: John Olmstead Hamilton 522-0409

SUNDAY, MARCH 7, 1982 9:00 a.m. to Noon

"BEGINNER'S BIRD HIKE" at Christie Outdoor Education Centre. This will be a bird identification hike for beginners. Bird Field Guides and binoculars will be supplied for those who require them. Meet at 9:00 a.m. at the University Plaza Parking lot in Dundas(next to Miracle Mart).
Leader: John Heaslip 627-3280

SATURDAY, APRIL 17, 1982 8:30 a.m.

"SPRING HAWK WATCH" Learn to identify these birds of prey on their northern migration. Meet at Beamer Point Conservation area at 8:30 a.m.
Leader: George Meyers 1-945-4217

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WORKSHOP AT SHORT HILLS WILDERNESS AREA SUNDAY,APRIL 4, 1982

Please plan to attend and bring pruning shears, loppers,hand saws, axes, etc. with which to clear trails. Ribbons will be provided to mark trails.

Meet at Eastgate Shopping Plaza,Queenston Rd.and Centennial Dr. Southeast corner of parking lot,at 8:30 a.m. or plan to be at front of Sanctuary at 10 a.m. M. SHIVAS(SANCTUARY DIRECTOR) 628-6846

MINUTES OF GENERAL MEETING OF MEMBERS OF THE HAMILTON NATURALISTS' CLUB held at the Headquarters of the Royal Botanical Gardens, Burlington, Ontario on Monday, February 8, 1982

Hazel Broker, President, chaired our monthly meeting, with over 100 members and guests present despite all the snow.

Mary and Norman Pomfret were thanked for acting as greeters and Ron Hepworth and Dave Bruton for providing the slides for the Foyer show.

Sympathy was extended to the relatives and friends of Jack Laughton, a member from Grimsby, who died earlier in the month.

It was announced that a new Nature Guide was being produced in Seattle and volunteers were needed to act as liason to naturalists visiting this area.

A special welcome was extended to the members of the Scout Troop from St. Giles United Church in Hamilton who were present.

Hazel Broker was very pleased to announce that Bill Crins had agreed to be a member of the Executive as Program Director and a vote of the members confirmed this.

Bill Campbell introduced our speaker for the evening, Dr. Louise Elder, whose program was entitled 'Consider the Lilies of the Field'.

We were given a fascinating and delightful series of slides of flowers of Ontario, the Rockies, Europe and the United Kingdom and Ireland.

Dr. Elder's close-up photography made us realise that flowers that are considered to be weeds are just as beautiful and intriguing as more exotic species. The commentary accompaning the slides was most interesting.

Bruce Duncan thanked Dr. Elder for her delightful presentation, which was both interesting and entertaining.

After the meeting, members and guests were provided with coffee and doughnuts organized by Shirley Klement and Charlie Zimmerman.

Barbara Reid, Secretary

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MONTHLY MEETING	MONTHLY MEETING
Time	MONDAY, MARCH 8, 1982 at 8 p.m.
Place	Royal Botanical Gardens Centre Auditorium, 680 Plains Road, Burlington
Speaker	"Environmentally Sensitive Area Planning in Ontario" by Dr. Paul Eagles, University of Waterloo- an illustrated discussion dealing with the problems natural areas face in today's growing urban society.
Next Meeting	Tuesday, April 13, 1982 (please note change of date)
VISITORS WELCOME	STAY FOR FELLOWSHIP & REFRESHMENTS

THE NIGHT OF THE OWL

by Lon L. Emerick

Early one cold January dawn, I shuffled into our darkened kitchen to start the morning coffee just in time to see a large bird fly up from the snow. Hastily, I fumbled for the 7x50 binoculars standing ready beside the large window which overlooks the backyard. Although we reside in a suburban area near Marquette, our home is located on the edge of the Carp River Valley, a magnificent wild region of granite hills and thick forests. We have seen a wide variety of wildlife - rabbits, racoons,a least weasel in its snow-white winter garb, deer and, one spring morning, a huge black bear. Now, as I focused the binoculars I made out the unmistakable round-shouldered form of a
Barred Owl perched on the top bar of my children's swing set. Suddenly, he drifted away into the dim woods; it was only then that I noted the inert cottontail rabbit in the snow.

After breakfast, we donned our snowshoes - the white mantle was over two feet deep - and traced out the story in the snow. A few crimson spots and bits of fur, a deep drag mark, and the clear print of wingtips told the tale. The unfortunate cottontail, only partly devoured, lay frozen in the snow. Hoping that the owl might return, we did not disturb his kill, although we thought we had seen the last of the successful night hunter.

That evening, however, at approximately the same light intensity (dusk) at which it had flown away in the morning, the owl returned and landed beside his prey. Now we could easily make out the dark brown eyes and the vertical black flecks on his breast. Seizing the rabbit with his talons, he started to pull and tug at the fur but it seemed frozen and unyielding. Fascinated, we watched the owl sit astride the cottontail, fluff out his feathers and assume an incubating position. All night long we checked periodically as the Barred Owl sat upon its prey, apparently thawing the meat; from time to time he would pull off chunks and devour them. At dawn, again at about the same illumination, the owl flew away with the last scrap of the rabbit inits talons.

It is unusual when one is able to have such a memorable and instructive wildlife drama in his own backyard. We will not soon forget the night of the Barred Owl.

(reprinted from Jack Pine Warbler, Vol. 52 (1) March/74)

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HOUSE FINCH

The House Finch is a relatively recent addition to Ontario's avifauna. The bird is native to western North America-breeding in parts of southern British Columbia-but was introduced to the east through the release of a small number of individuals in 1940 on Long Island,New York. Since then it has exhibited a relatively rapid extension into its new range north,south and west of its geographic location of introduction.

The species was initially recorded at two widely separated areas of the southern part of the Province of Ontario as early as a decade ago-Fort Erie and Niagara-on-the-Lake,and Kingston(James et al.,1976). It has since made slow but steady inroads into other parts of the areas in between. Although the House Finch has been reported as far north as Marathon,Ontario-north shore of Lake Superior(pers.com.N.Escott,1980)-it is reasonable to assume that this was a western vagrant as opposed to a southern stray. Confirmed breeding records for the province currently exist for both the Niagara-on-the-Lake and Kingston areas.

(reprinted from Pickering Naturalist Vol. 5(4))

HAMILTON NATURALISTS' CLUB EXECUTIVE 1981-82

President	Miss Hazel Broker 52 Paisley Ave., South, Hamilton Ontario L8S 1V3	527-0333
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Social	Ms Shirley Klement 1375 Mountain Grove Road,Burlington,Ontario L7P 2H1	336-5433

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THE COMMON CATTAIL

by Bessie Waters

The next time your skis or snowshoes take you past a swampy area were tall brown cattail plants stand bedraggled by the winter storms, pause awhile to admire these derelicts of the previous summer. They are worthy of your attention.

According to researchers, cattails are a common plant right across Am America, as well as in Europe and Asia. As many as 300,000 seeds may be packed into one single velvety head, and to each are attached from forty to sixty slender hairs. These are the parachutes that carry the cattail seed for up to a hundred miles or more. Individual seeds are so tiny that it takes nearly 100,000 to weigh an ounce.

An interlacing mat of roots down in the muck below spread readily to form new plants, as many as 35 new shoots may develop around a single plant in one season. An acre of such plants, where they have grown for many years, may supply 140 tons of starch-filled roots. These the Indians used to harvest as a vegetable crop, for the dried roots were crushed into an excellent flour.

Also, the Indians at one time used the leaves for weaving mats,the fluff for lining moccasins and the pollen for making cakes-a special delicacy. So the common cattail has been a valuable plant, and some day may be needed again.

(reprinted from Huntsville Nature Club Notes-Vol. 22,#6)

WINTER-ACTIVE SPIDERS AND INSECTS

by Cassie W. Aitchison

Once a hardy winter camper awoke in his quinzhee(a now hut with its floor cleared of snow) after a night's sleep to find a mosquito-like insect flying around inside. His surprise is understandable since few people realize that the soil under the snow can be warm enough for animals to remain active there. The temperature inside the quinzhee would be comparable to that under the snow (probably warmer due to the body heat of one person), so the flight of the insect is really not as unlikely as it seems. Perhaps even more surprising, spiders and insects have been seen on sunny, windless days with temperatures near zero degrees C.

In the past few autumns, when most people are preparing to spend their winters cosily indoors, I have been preparing to spend mine outside in pursuit of little-known and generally disliked beasts. These beasts are found under the snow which acts as a blanket over the soil surface, protecting invertebrates(animals without backbones) and small mammals such as mice and shrews which remain active throughout the winter. The temperature in the space between the soil surface and the snow cover(the SUBNIVEAN space) ranges between-30 to-10 degrees C.

Two factors critically affect the insulating capacity of snow. The first is its density, or the proportion of air in a given volume. If the snow cover is light and fluffy, it then acts as a good insulator, but if heavy and hard, it is a poor insulator. Wind packs snow crystals, providing a dense snow cover as seen on the open prairie.

The second factor important to insulation is thickness. Once a layer of average snow density reaches 20 cm or more (a thickness coined the "niemal threshold") it buffers the temperature of the subnivean space from fluctuations of air(supranivean) temperature.

Trapping was done in the fenced property of Canada Cement Lafarge Limited at Fort Whyte, an area where snowmobiles,snowshoers and skiers would not compress the snow cover. Generally, the snow cover varied between 40 to 70 cm thick, which necesitated considerable digging to reach the actual trap in the ground. During the first winter, the snow was swept aside to reach the trap, to the detriment of mitts, ski poles, time, and insulation of the snow cover. Towards March the snow above the traps had become so hard that I had to use a saw to remove it. In the second winter, an improved method was used. A pair of portable cylinders were slid carefully down into the snow until they sat on the ring and lid above the trap. The inner cylinder and the snow column it contained was lifted up by means of the lid handle, while the outer cylinder kept the surrounding snow in place. This method was quite successful in speeding up the collecting process and maintaining the snow cover at a more natural density.

The traps used were pitfall traps-an inner cup containing a small amount of preservative fitted into a outer cup whose rim was level with the soil surface. Active animals were captured when they fell into the liquid, but some probably escaped. At times, spiders were seen rescuing themselves by means of their silk draglines, and sometimes small beetles turned away from the precipice. The traps were operational from October to May (the usual time of snow cover) and were emptied weekly except in the coldest months(January,February and March)when they were emptied every two weeks.

Temperatures under the snow were monitored in the first winter by an ohmmeter in conjunction with thermistor probes. However, ohmmeters ceased to function reliably below 4 degrees C, so in the second winter a simple radiotelemetric device calla "clicker" was used. The lower the subnivean temperature,the lower the frequency of pulses(clicks) it emitted. The broad-beam,AM radio frequency pulses were received by a transistor radio.

Winter-active Spiders and Insects (continued)

Subnivean temperatures in the first winter generally varied between -4 degrees C and -5 degrees C, and in the second winter between -5 degrees to -6 degrees C. There was a tendency for the subnivean temperature to be influenced by the air temperature after a few days. Occasionally in a cold snap the subnivean temperature dropped to -10 degrees for a short period.

The group of animals in October, immediately prior to snowfall, included slugs and snails, earthworms, centipedes, false scorpions, mites, spiders, harvestmen, beetles, springtails, flies, bugs, leafhoppers, wasps and ants, moths and butterflies, grasshoppers and crickets, and thrips. The main groups that were found to be winter-active (i.e., active in winter months or at temperatures less than -2 degrees C) included spiders, mites, springtails and beetles; a few flies and parasitic wasps were also winter-active. Generally with the exception of springtails and flies, the subnivean, winter-active invertebrates were predatory. Thus, the springtails and flies may be at the bottom of the winter food chain, if these animals do feed at these low temperatures.

However, after snowfall, the active groups were reduced to mainly mites, spiders, springtails, flies, wasps, and beetles. In January to March, only three or four groups were active - mites, spiders, springtails, and at times rove beetles.

More families of mites were present in traps in October, although more individuals were taken in February. Three families were predominant in midwinter, with a little-known, soft-bodied, free-living family primarily responsible for a great increase in mumbers in late February and early March. As the winter progressed, the numbers of mites tapered off again, despite rising daily temperatures.

The springtails active in early winter represented three families. In early winter the majority were large, litter-dwelling specimens. As the season progressed, smaller specimens of another family became more common. Most of the winter-active springtails belonged to a new species never identified before this study, and which is closely related to winter-active European species. In March there was a tremendous increase in numbers, with many young present. This coincided with the minor increase in subnivean temperature. Then numbers dropped again, only to increase as the snow cover melted. This group has been called "glacier" or "snow fleas" and has been noted on ice and snow in Germany, Switzerland, Sweden, U.S.S.R., Greenaldn and Manitoba.

Five spider families were frequently encountered in winter. Maxima in numbers of species and of individuals occurred in October and November. Many immatures were active in this period. In all sites there was usually a mixture of adults and immatures from January to April.

The beetles were represented mainly by rove and ground beetles. Activity was restricted to October and November almost exclusively, with a slight resumption of activity in April as the subnivean temperatures rose. This order therefore appears to be relatively sensitive to cold temperatures.

The flies were represented by mosquito-like families and other small-sized families - a total of five families active under the snow. Again, their numbers declined quickly in October and November, became zero for most of the midwinter, and increased again in April and May.

The majority of wasps trapped were small in size and are known to be parasitic on families of flies that were trapped. Generally wasps and flies exhibited simultaneous activity, although the wasps were more restricted in activity than the flies.

Winter-active Spiders and Insects (continued)

Certainly temperature dictated which invertebrates were active under the snow. Generally, the diversity of active families in autumn was greatest, with a a sharp decrease by January and February (when the subnivean temperatures were lowest), and a slight increase in spring. Mites seemed active at all temperatures The new species of springtail was the most abundant, winter-active representative of that group; it seems to be a lover of cool temperatures and was not trapped in midsummer. By contrast, another springtail family was never seen at cold temperatures. Regarding winter-active spiders, the miniscule dwarf spider was most tolerant of low temperatures, active down to -8 and -6.2 degrees C respectively. Another species known to be inter-active in Europe was active in Manitoba only during October and November; its activity ceased below -5.3 degrees C. More rove beetles were active at lower temperatures than are ground beetles. In general, the dips in subnivean temperature by mid-December seemed to halt activity of most invertebrates until March.

After snowmelt in mid-April, more and more invertebrates became active as temperatures rose. By early summer a myriad of insects, spiders, and other invertebrates were again fully active in the soil, on it surface, on vegetation and in the air.

(Reprinted from Manitoba Nature, Winter 1977)

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A MID-WINTER QUEST FOR BATS

by R.V. Lindsay, Arden, Ont

The day was just right, not too cold, no wind, and mercury squeezing the zero mark. I contemplated visiting a long-abandoned mine site some 70 miles distant; the journey being initiated primarily to confirm reports of the mine's reputed attraction to non-migratory bats seeking "hide-a-way" quarters to slumber away long winter months.

Unsuccessful in persuading any local person to accompany me, I finally managed(by cajolery and some effective arm-twisting) to induce an acquaintance to join me, but not because of any undying affection for bats.

With equipment packed we drove 30 miles over snow-packed roads,parked the vehicle, then proceeded by snowmobile over a roller-coaster series of breath-taking dips to the base of a lofty hill. After an exhausting tramp through thigh-deep snow we managed(by sheer luck, I'M sure) to locate the 6 b 8 foot entrance to the 500 foot long mine tunnel, artistically concealed by a thick curtain of ice formed by water drainage from the steep slope above.

Unequipped to deal with the problem confronting us, valuable time was lost trying to chop a hole large enough to admit two heavily clade batmen(chiropterists, not chiropodist or chiropractor, if you please!). Finally, the first man to gain entrance landed-no, not on his head but feet first, in foot-deep water formed by the accumulation of ice at the tunnel's entrance. A short distance ahead, the tunnel's floor was water-free, though moist, as we stepped cautiously over loose rocks with flashlights beamed alternately on ceilings and floor.

About 200 feet from the tunnel's entrance, we began to find our first bats hanging like hugh furry grapes, singly and in clusters. Farther along the passageway and well beyond the influence of frost, bat numbers increased noticeably until clusters numbering 100 and 150 individuals were noted. In some of these clusters bats were wedged together like bees, several tiers deep.

While my companion took charge of flashlights I attempted to tally bat numbers and species. As far as we could determine, all hibernating bats appeared

A Mid-winter Quest for Bats (continued)

to be in a comatose state and, like all bats do, hanging heads down. The fur of a few singles presented a frosty appearance-an identification aid to the eastern pipistrelle. Other singles dangled with wings partly open-the small-footed bat. Still another species, Keen's bat, was readily identified by its extra long ears and sharp-pointed tragus,(finger-like process on the ear). The fourth and most abundant - the little brown bat- represented at least 95% of the total population.

Progressing slowly toward the rear of the tunnel we found bat numbers in greatest concentrations. Stepping gingerly to avoid stumbling,the beams of my torch picked up a bat casualty, a helpless victim in deep distress. We speculated it had perhaps lost its grip on an insecure perch and in a semi-conscious state, had launched forth striking some sharp projection with sufficient force to snap a wing. There it lay, like fallen Lucifer, gnashing its teeth and squeaking its rage at fate, its marvellous built-in mechanism for detecting solid objects having failed it at a crucial moment.

Acutely sensitive to any disturbing sounds in their sepulchre of silence, several bats seemed to waken from their dream world to take to the air, then suddenly, a small swarm left their perches to shiz about, figure-eight fashion, brushing our faces with their leathery wings as they twisted and turned in a frantic endeavour (I prefer to think) to avoid colliding with us.

Up to now my companion had tried valiantly to maintain his composure and to cooperate; but this latest and most unnerving development proved the turning point-the climax to a day of vexations. To be caught in the centre of this "anarchy-on-the-wing" movement was just too much to take.

Gasping, "Let's get out of here", he fled, the sound of his fast retreating footsteps replaced by the ghostly whir of bat wings.

On reaching the tunnel's entrance I was surprised to find my companion had in some manner managed, unaided, to squeeze through the slippery hole. There he stood shivering in the frigid air, only too willing to call it a day. Tabulating results we found to our delight the total bat population had reached a higher figure than we had envisaged, close to 2,500 individuals representing four species.

(reprinted from Manitoba Nature, Vol.17(4)-Winter 1977)

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"CANADIAN NATURE ART" EXHIBITION COMING TO R.B.G.

The sixth "Canadian Nature Art" travelling exhibition of the National Museum of Natural Sciences, Ottawa, will be on view at the R.B.G. library from March 1st to the 18th. Weekdays 9am to 5

In this show ther are 35 paintings,drawings and prints by contemporary Canadian artists.

Members of the Hamilton Naturalists' Club and their friends are invited to the Preview Night, Sunday, February 28th, 7.30 to 9pm.

Mr. Arnet Sheppard of the Canadian Nature Federation and some of the artists whose work is represented in this exhibition will be there to meet you.

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THE ODD COUPLE

BY Ian Walker

The harsh, winter environment appears to be an uninviting prospect for any form of life whether it is a plant or animal. Most trees empty their branches of leaves and retreat into a dormant winter condition until warm weather returns. Many animals greatly reduce their activity in winter, or in the case of many birds, abandon our climate to accept the sun's warm invitation nearer the equator. For those of us who cannot escape the reality of winter, we have learned to enjoy some of the unique conditions it provides.

Not all plants greet winter with such drastic transformations as our wildflowers and cowardly hardwoods. One such group are an obscure group of plants known as lichens. These include such unusual and varied members as Old Man's Beard; British Soldiers, and Reindeer Lichen(Reindeer Moss). Although normally overlooked, this group contains numerous colourful species inhabiting the ground, dead stumps, rock, and even tree bark. Lichens have been forced to accept some of the harshest conditions on earth in order to compete and survive on a planet dominated by faster growing, more demanding plants. Lichens have accepted this challenge and form the dominant vegetation of polar regions and also enjoy a comfortable home on bare rock and exposed to the hot desert sun.

> "In one experiment, dry lichens were exposed to a temperature of 434 degrees F. This, you will recall, is more than twice that of boiling water. The lichens were exposed to this heat for seven hours, at the end of which time they began growing again!"
>
> PLANTS WITHOUT LEAVES-Ross E. Hutchins

How do lichens withstand such unfavourable environments? Actually, lichens are two plants which have united their structures to form an extremely hardy combination. Many people describe this as a "Partnership" but I prefer the term "Marriage". Like most marriages, they are often mistaken for partnerships but are actually dominated by either the husband or the wife. This can be expanded into an amusing analogy.

In the case of lichens the "husband" is the hardworking sould who operates a "factory" and converts his hard work into food to feed the entire household. In lichens, the husband is an algae and it works to convert the raw materials available in the air into sugar using sunlight as a source of fuel to power the factory. The sugar is the food which the algae provides for the household.

The wife is a fungus which maintains the household and keeps its algal partner confined to the "workshop". The "workshop" is normally a thin layer near the surface of the lichen where it can obtain lots of light.

As in most marriages, the algae and fungus will normally have a few children, and in lichens there are several alternatives to choose from. Many lichens produce "children" called isidia which contain both an algae and a fungus componment. The isidia eventually become separated from their parents and must set up housekeeping on their own. As they grow, this produces another lichen. Another possibility is to produce soredia. These are basically similar to isidia but are smaller, more untidy, and often kept confined to a structure known as a soralium. Often, the fungus decides to have children without help from the algae. In this case the children are known as "spores" and are kept in a fancy cup-shaped "crib" known as an apothecium. No algae are contained within the spores, so when these daughters are released, they must develop into a fungus and then capture an algal husband in order to survive.

THE ODD COUPLE (continued)
How successful the spores are is difficult to determine. The algae are not very common outside of the lichen and it is undoubtedly a proud spore which does succeed.

The lichens spend much of their life in a dormant state, reviving whenever moisture swells the tissues of the plant, usually after a light rain. This prevents the lichens from growing rapidly, yet this conservative growth may continue indefinitely, perhaps for a thousand years or more if left undisturbed. Although they are extremely hardy when exposed to natural conditions, they are extremely sensitive to air polution. Examining trees exposed to the exhaust of cars and industry clost to town, you are likely to find few lichens. The next time you are snowshoeing or skiing through the forest, however, inspect any branch or trunk of a tree. There should be a broad array of these amazing plants awaiting you.

FACTS ON LICHENS

* Lichens have been used as indicators of time and climate; they provide evidence on the age of glacial moraines, of lava flows and of ancient human monuments.
* Lichens were once used as a source of natural dyes.
* Litmus, used as an indicator paper familiar to chemistry students, and other reagents are still obtained from lichens.
* The perfume industry continues to make use of lichens in various fragrances, the most widely employed species is Pr'rnia prunastoi (Oak Moss).
* Lichens have an Achilles heel: They are stongly susceptible to the substances with which man now pollutes the atmosphere. They are therefore good indicators of air pollution.
* Certain lichen colonies have been estimated to be more than 2,000 years old.

(Reprinted from New Brunswick Naturalist, Jan. '79)

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A WEEK AT LONG POINT BIRD OBSERVATORY

By raising over $1500.00 for the Baillie Birdathon 1981, Hamilton Naturalists' Club has qualified to send up to three volunteers for a one week visit to the Long Point Bird Observatory, free of charge (transportation to and from Long Point not included). If you are interested in applying to participate in this activity please call Hazel Broker, 527-0333.

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MUSKRATS AND COLD - A STUDY OF SURVIVAL

by R. A. MacArthur

On this January morning the marsh was a glittering, sunlit world of frosted cattails and wind-sculptured snow. It was a land of penetrating silence broken only by the crunch of snow underfoot and the rustle of frozen stems yielding to a northeast breeze. Mute tracks crisscrossing and intermingling in the snow revealed an earlier presence of coyote, fox and mink.

To the casual observer, these tracks were the only signs of animal activity in this wintry landscape. However, with sensory capabilities extended by modern electronics, I was aware of another life beneath the ice. The high-pitched "hum", coming over the head-phones of my radio receiver at this moment, emanated from a dark plug of frozen pondweed jutting through the glazed snow surface, 10 metres to my left. As I listened, the tone became rhythmic, periodically fading away.

This signal was generated by a miniature transmitter surgically implanted into the abdominal cavity of an adult muskrat, Ondatra zibethicus. The animal was one of several that I had equipped with transmitters during the previous autumn. The source and fluctuating nature of the signal revealed that this particular muskrat was feeding in the vicinity of a "push-up." Having noted the identity and location of the animal, I made a brief recording of the signal on the tape-recorder module of the receiver. Later, this tape signal would be decoded in the laboratory to determine the body temperature of the muskrat while it had been foraging under the ice.

The above routine was one night repeated many hundreds of times during all hours of the day and night, and for two successive winters at the University of Manitoba Field Station, Delta Marsh. These telemetry observations furnished insight into the winter habits of the muskrat and comprised a major phase of a thesis project concerned with those adaptations enabling the species to survive in a northern climate.

For one interested in the mechanisms by which mammals adjust to cold, the muskrat poses a fascinating study. Like other non-hibernators existing at northern latitudes, this rodent must cope with the energy demands of regulating internal body temperature at a high and relatively stable level. This problem of maintaining "homeothermy" would seem especially acute in a semi-aquatic mammal like the muskrat, which regularly enters near-freezing water to forage during the winter. The cooling capacity of water far exceeds that of air; indeed, cold water is considered one of the harshest environments encountered by mammals. Moreover, the muskrat is among the smallest of aquatic mammals and hence it is one with the greatest potential for cold stress in water.

Notwithstanding these apparent handicaps, the muskrat has a geographic distribution which is excelled by few other mammals. In North America,muskrats frequent marshes, lakes, and streams across the continent, ranging from the Gulf of Mexico in the south, to the arctic tundra regions of northern Canada and Alaska. Following repeated introductions in the early twentieth century, this North American rodent spread rapidly through continental Europe, and its present range in Eurasia includes Scandinavia and Russia.

What sort of adaptations permit the muskrat to survive over such a diverse range of climatic conditions, and in particular, to endure a northern winter? Certainly the most fundamental of these must be the construction and efficient use of shelters. Amid the exodus of shorebirds and waterfowl from the marsh in late summer and early autumn, muskrats are busily constructing and repairing the lodges that will provide refuge during the cold months ahead. The stimulus

Muskrats and Cold -A Study of Survival (continued)

for this fervor of lodge-building activity is not fully understood, but probably involves the rapidly declining daylength and air temperatures typical of this season. The lodge-so symbolic of northern marshes-is basically a semi-floating mound of emergent vegetation and bottom detritus into which muskrats burrow and excavate a nest chamber and one or more underwater entrances. The larger of these structures will serve as dwelling quarters,while the smaller lodges function mainly as feeding stations.

Clearly then, the muskrat is able to maintain an optimal microclimate during winter with a minimal expenditure of energy. Nevertheless, this rodent must still enter icy water to gain access to the pondweed and rootstocks of bulrush and cattail upon which it depends for food. For such a small mamal, immersian in cold water could theoretically result in a dramatic loss of body heat and a drop in internal temperature, leading eventually to hypothermia. What safeguards does this animal have against excessive cooling in water?

To begin with, if the much-esteemed pelt of the muskrat is examined closely, it is seen to consist of a soft, dense underfur overlain by coarse outer guard hairs. The rich underfur traps a boundary layer of air next to the skin, and this air is retained during immersion in water, providing an excellent barrier to heat flow. Loss of heat from the naked feet and tail is minimized by permitting the temperatures of these extremities to approach that of the surrounding water. In addition, the muskrat possesses well-developed deposits of brown fat-a tissue for which the only known function is that of generating heat. This brown fat provides a "thermal blanket" which warms blood returning to the body core from the cooled periphery. Furthermore, this tissue is distributed so as to selectively warm those regions of the body that are most sensitive to cooling, such as the brain, spinal cord,heart,and kidneys.

Despite these morphological and physiological specializations, the muskrat displays progressive internal body cooling when subjected to immersion in cold water in the laboratory. My field studies also revealed a net decline in body temperature during under-ice excursions, though of a far lesser magnitude than might have been predicted from laboratory findings. It appears that muskrats in nature have recourse to at least two mechanisms for avoiding hypthermia which were not available to animals previously tested under laboratory conditions. The first of these involves a slight, but significant, increase in body temperature prior to leaving the lodge. By initiating activity at an elevated body temperature, a muskrat can incur a greater heat loss, and hence can forage in cold water for longer periods. Secondly, muskrats retard the cooling process by periodically withdrawing from water to rewarm in a feeding lodge or push-up. Brown fat, with its capacity for rapid heat production, probably contributes significantly to this intermittent rewarming.

Freeze-up heralds the appearance of other feeding shelters, or push-ups, along the open bays and channels of the marsh. As their name implies,these structures consist of small plugs of domes of submergent vegetation(i.e.pondweed)"pushed up" through natural crevice, or holes gnawed in the ice. It is interesting to note that push-ups and feeding lodges are often arranged about a central dwelling lodge in a "stepping-stone" pattern. Thus the resident muskrats have access to all points in their home range via a series of short underwater excursions. The animals can breathe and feed at these sites while shielded from the low temperatures and chilling winds outside.

To evaluate the effectiveness of protecting muskrats from inclement weather, I placed temperature-sensing probes within a number of these shelters. The results revealed that when out of water, the muskrat exists in a equable microclimate during winter. For example, inside dwelling lodges where animals

Muskrats and Cold - A study of Survival (continued)
spend most of the day resting and sleeping, temperatures averaged close to +10 degrees C and were as much as 35 degrees C higher than external air temperatures measured concurrently. Even in the thin-walled push-ups,microclimate temperatures seldom dropped below -7 degrees C,despite outside temperatures pushing -30 degrees C.

The highly buffered microclimate of the muskrat may be attributed to a variety of factors. Firstly, the presence of open water in the plunge hole of the lodge or push-up warms the air in the chamber above. Secondly, the insulation provided by the lodge or push-up may be enhanced by snow cover - especially in stands of bulrush or cattail, which retain a considerable quantity of drifted snow. Thirdly, a dwelling lodge is normally co-inhabited by several muskrats, and the heat accumulated from their huddled bodies results in a substantial increase in nest chamber temperature.

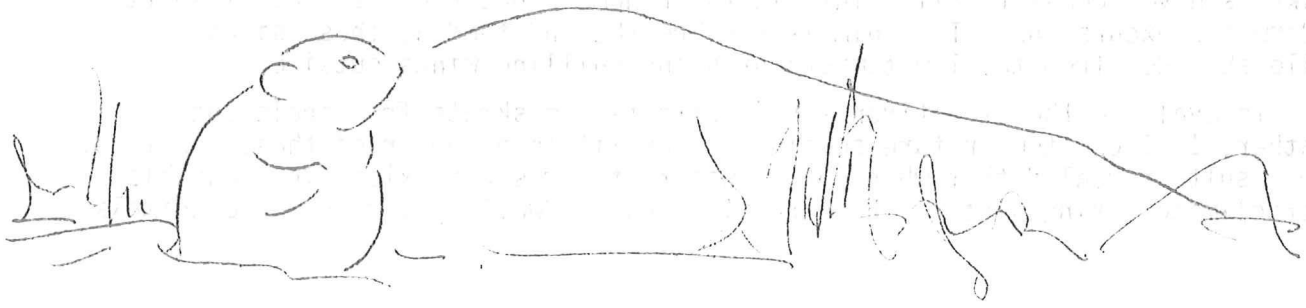
Thus, through the integration of behavioral and physiological responses, the muskrat is able to avert potential cold stress during the winter. Secure in his microcosm beneath the snow and ice, this little mammal carries on an almost phlegmatic existence of resting, sleeping, and feeding. Predators are few; only the mink, equally at ease on land and in water, and adept in penetrating the lodge wall, preys heavily on muskrats during this season.

The most serious threat to the muskrat population in winter is freeze-out. This might result from muskrats attempting to overwinter in a shallow slough, or from excessive freezing of a marsh in the absence of an insulating blanket of snow. The sinking frost line may not prove detrimental so long as the animals have access to rooted vegetation near the lodge. Residents then move into the "basement" of the house, and use air spaces and trenches dug in the marsh bottom as travel lanes beneath the ice.

For those muskrats lacking access to such food reserves, however, it is often a grim scenario. As freeze-out advances, these animals may feed upon the vegetation comprising the lodge, as well as whatever animal fare is available. Since the plunge holes of lodges are among the last regions in a marsh to freeze, sticklebacks and bullheads often concentrate in these passages, and are readily consumed by hungry muskrats. Finally, in desperation, these hapless individuals gnaw through the side of the lodge and wander upon the surface of the ice. In many cases, these "wanderers" will succumb to freezing or fall easy prey to marauding canids or minks.

For the species, the important thing is that some individuals will survive the winter to reproduce in the following spring and summer. The fecundity of this little mammal is such that even a population heavily decimated by winter-kill may be largely restored in a single breeding season. As the cycle continues, this new crop of muskrats will be faced with another prairie winter and all its attendant hazards. If fate is kind, the vagaries of water depth, snow cover, and food availability will be in their favor, and these animals will pass an easy winter in their retreats beneath the snow and ice.

(reprinted from Manitoba Nature-Winter 1977)



POLAR BEAR PASS

Pipelines, underground mining, oil and gas exploration would be permitted in Canada's first northern ecological reserve, if recommendations of a working group are accepted by the federal government.

A report of the working group, released last September, concludes that Polar Bear Pass on Bathurst Island should be "formally recognized as an ecological site and given long-term protection under suitable legislation." However, the report also says that "alternative land uses could be accommodated at the site without serious disruptions to the ecological values."

This position is disputed by conservationists. Rick Pratt of the Canadian Nature Federation called the report "misleading" and said it forms a "dangerous precedent."

"I do not believe that the multiple-use management suggested in the report is appropriate to protect this sensttive arctic oasis,"said Mr. Pratt. "Furthermore, industrial developments is inconsistent with the whole concept of ecological reserves. These are supposed to be benchmarks against which environmental change is measured."

During more than a decade of research, scientists have found that Polar Bear Pass supports 40 species of birds, is an important calving and wintering ground for muskoxen and a seasonal migration route for Peary caribou, a threatened species. The animals there live in a fragile balance with a harsh climate. "What chance do other important ecological sites have if conservation values and the whole raison d'etre for ecological reserves are compromised at Polar Bear Pass?" asked Mr. Pratt.

Last summer, industry tried to open up Polar Bear Pass for petroleium exploration. Panarctic Oils Ltd., a leaseholder in the proposed reserve, applied to the federal government to drill in the area. However public opposition and the government's poor reception of the application prompted Panarctic to withdraw their proposal in August.

In 1974, the International Biological Program identified 27 sites for ecological reserves in the High Arctic. Progress since then, however, has been excruciatingly slow. The first seven sites were submitted to the working groups(an interdepartmental committee) in 1975, but none of them yet has permanent protection. Polar Bear Pass, the first site to be considered, was given temporary protection in 1978, pending recommendations from the working group. Now that those recommendations have finally been received, the fate of the site depends on the public response to the report and, ultimately on the decision of the minister of Indian affairs and northern development.

(reprint from Nature Canada January/March 1982)

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YOU ARE INVITED

Dr. James Harrison, Ottawa, will speak at the United Nations association meeting: TUESDAY,MARCH 9,at 8pm.
Y.W.C.A.,75 MacNab St. S.,Hamilton.
Topic: "UNESCO in the United Nations Family"

Dr. Harrison is Vice President of The Canadian Commission for UNESCO and is involved in the "Man and Biosphere" program, the most far ranging and significant science program that UNESCO is now overseeing.

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HENSLOW'S SPARROW

by George W. North

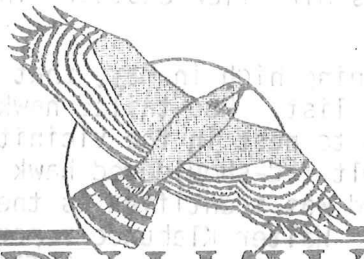
Each different kind of bird has evolved to live in a certain type of environment; this applies especially in the nesting season. Unfortuneately the Henslow's Sparrow is found in an environment that is not generally compatible with modern intensive agriculture. It lives in lush grasses in a certain type of old fields and meadows. The ground must be moist at all times but not too wet nor ever subject to flooding . The field may be in low flat land that is well drained, or in high ground where the bedrock is close to the surface, or on a gently sloping hillside where moisture seeps down from a higher level. But most important of all the field must not have been cultivated for many years past.

Forty or fifty years ago the Henslow's Sparrow was more common, as due to historical events there was more suitable habitat available to it. Right after the Great War large tracts of land near such cities as Hamilton and Toronto were acquired by speculators. Then during the Great Depression of the twenties and thirties these fields lay vacant and fallow. By not being tilled some of these fields became attractive to Henslow's Sparrows. I found my first Henslow's Sparrow on July 10, 1929, in an old field near the brow of the escarpment at the top of Webster's Road, Saltfleet Township. For many summers there was a thriving colony in a field on the east side of Parkdale Avenue North just south of the old Beach Radial Line. At the eastern edge of this field there was an old long-abandoned well filled almost to the brim with salt water. I have wondered if this was the original well that gave the township its name. I have also speculated whether salt is attractive to these sparrows. I also used to find Henslow's Sparrow in the field south of The Pinery later appropriated by McMaster University. Another favorite spot for Henslow's Sparrows was in the fields on both sides of Upper Horning Road south of Mohawk Road. There were also many spots in Beverly Township and Puslinch, as well as in fields north of Campbellville and Milton.

Sometime in the thirties W. E. Saunders took me with him to a meeting of the Brodie Club where he chided the members for not having yet found the Henslow's Sparrow in the Toronto Region. He had had a letter from a woman living north of Toronto who had enquired about a small dun-colored sparrow that perched atop a tall weed, threw back its head and uttered two high-pitched insect-like notes. Soon after this Murray Speirs found a colony of Henslow's Sparrows on Stavebank Road below Erindale. Stuart Thompson and his wife later found a nest there.

Where were the Henslow's Sparrows when southern Ontario was originally covered with forest? Possibly they lived along the drier edges of marshes; that is where I found them living in more recent years at Luther Marsh.

The forest of huge trees north of Lake Erie was largely cut down during the latter half of the nineteenth century. The land was then planted to wheat and other field crops. After several generations the soil lost its fertility where it was light and sandyand was abandoned t wind erosion. At the time of the Great War and later reforestation was resorted to to stop the formation of dunes. When I visited southern Norfolk County in the early thirties it consisted mainly of abandoned farms. As some of these fields grew up in grass and weeds they were colonized by Henslow's Sparrows, as in South Walsingham.When John MacArthur and I cycled to Point Pelee in the forties there were several fields with Henslow's Sparrows along No. 3 Higway. When it was realized that this land, with fertilizer, was good for growing such crops as tobacco, Strawberries, and especially corn, the habitat of the Henslow's Sparrows disappeared. Did these sparrows move farther north in Ontario, where they are found sometimes now.



THE GRIMSBY HAWKWATCHER

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Volume 1, #1 Spring 1981

THE SPRING 1981 MIGRATION

March 1st, 1981 just wasn't early enough to begin watching Hawks at Grimsby this Spring. A record-breaking mild-spell in late February sent wintering Great Lakes region raptors northward to the happy nesting grounds. Thus, despite good numbers of wintering rough-legged hawks in the region, the number of this species migrating from March 1st on was comparatively low.

Similarly, an early red-tailed hawk flight, during the same period probably contributed to lower numbers of red-tails recorded from March 1st onward. Local observers reported wintering owls also left the region during late February. The early migration of red-tailed and rough-legged hawks was observed at both Braddock Bay and Derby Hill, New York, where observation began on February 15th.

Despite this seemingly lost opportunity, Grimsby observers persisted throughout March, April and May. The final result of over 16,000 raptors observed, was our highest count yet! The other Lake Ontario lookouts, mentioned above, recorded substantially lower numbers in 1981 over the previous two years.

Although over-all Grimsby numbers were up over 1,000 birds, closer scrutiny reveals that for most species, the season was one of marginal gains or losses ranging to substantial lower numbers.

For example, sharp-shinned hawks were off 600, red-tails down 353 and red-shouldereds down 192 over the previous seasons' tally. By contrast however, the broad-winged hawk flight more than made up for the lack-lustre showing of other species. On three separate occasions, this hawk put on a spectacular display with 2,199, 1,729 and 2,120 observed on April 19th,26th and 27th respectively. The final tally of 6,956 was an increase of 2,000 birds over the previous year.

The daily observation data at the conclusion of this summary reveals the detailed account of each species occurence during the migration. Other than the occasional peregrine falcon and merlin, rare raptor sightings were not to be had. Hopefully, we will see something exotic in raptors before our first ten year study period is completed in 1984. An exotic did occur

The Spring 1981 Migration (continued)
however, in the visitage of our now almost annual sandhill crane. In yet other new wrinkle, this bird flew eastward in an apparent "reverse" migration.

Suspicion was running high in May, that we may have added another raptor species to our "local" list. Red-tailed hawks, kestrels, turkey vultures and harriers are known to nest in the vicinity. On five different occasions however in May, an adult red-shouldered hawk was observed. On more than one occasion, this bird was identified as the same individual due to plumage peculiarities. Walter Klabunde reports on at least one occasion the bird flew east contrary to the normal flight direction. Add to this the fact that the red-shouldered is one of our earliest migrants, seldom seen in adult plumage beyond mid-April.

Another surprise this season, was the arrival of a bus-load of visitors from the St. Thomas Field Naturalists' group. The group, on an excursion to the Niagara River, was headed by veteran hawk cliff raptor banders. During the past several seasons, it has been standing room only during late March and early April period with as many as 75 observers on hand. At such times, parking is possible only outside the conservation area on Quarry Road. This however, was our first busload!

Observer coverage amounted to 85 days or 585 hours during the March 1st 'til May 31st coverage period. This yielded a hawk per our rate of 27. Not bad on the average, but oh, those off days.

March

By mid-March, the only significant species migration was that of the red-tailed hawk with 126 birds,189 birds and 311 birds on March 5,14 and 16 respectively. The first eagle, an adult Golden was also sighted on the 16th. Other species were relatively scarce until March 22nd when 7 Cooper's and 75 red-shoulders accompanied 182 Red-tails over the lookout. A few days later on the 24th, an adult bald eagle flew past. This bird turned out to be the rarest raptor of the entire migration. March 26th was the kind of day we all like to have with 9 species sighted including 11 Coopers, 41 Red-tails and 43 Red-shoulders.

As usual, the flight was very steady in late March. On the final day, Turkey Vultures and sharp-shinned hawks gave us a glimpse of things to come in April. During the same day the Red-shouldered hawk put in its last strong showing with 106 sightings. By March 31st over 80% of this species flight has passed.

April

Turkey Vultures peaked a bit early with 146 on April 2nd. Sharp-shinned hawks were counted in the hundreds from April 7th onward. On April 10th, 27 Cooper's hawks were tallied, the best day of the migration for that species. This corresponded to 486 sharpies on the same day, also their best showing. Harriers were steady in modes numbers throughout April.
New species were added to the migration on April 4th(Osprey),April 10th(BW), April 8th (Merlin) and April 12th(Peregrine). On no less than 5 different days, all four common buteos were sighted! Kestrels were steady in small numbers from late March until at least the first week of April.

Sharpies, Red-tails and Broad-winged hawks continued very steady throughout late April. Spectacular flights of broad-winged hawks occurred on April 19th, 26th and 27th. On April 27th the last GO's and Rough-legged hawks of the migration passed by.

May

The strength of the April flight carried over into the first week of May. Again sharp-shinned, Broad-winged and Red-tailed hawks dominated. Two

The Spring 1981 Migration (continued)

May (continued)

golden eagles, one each on the 14th and 15th were the highlites of the month. Daily flights were small from mid-month onward.

Participating Organizations/Co-Ordinators 1981

Buffalo Ornithological Society/ Walter Klabunde
Hamilton Naturalists' Club/ Dave Copeland
Toronto Field Naturalists'/ Red Mason

Special thanks to the Niagara Penninsula Conservation Authority for their continued co-operation.

GRIMSBY DAILY COUNT 1981

Species Key

TV-Turkey Vulture
GO-Goshawk
SS-Sharp-shinned Hawk
Ch-Cooper's Hawk
RT-Red-tailed Hawk
RS-Red-shouldered Hawk
BW-Broad-winged Hawk
RL-Rough-legged Hawk
GE-Golden Eagle
BE-Bald Eagle
NH-Northern Harrier
OS-Osprey
PG-Peregrine Falcon
ML-Merlin
AK-American Kestrel
UID-Unidentified Hawk

Date	TV	GO	SS	CH	RT	RS	BW	RL	GE	BE	NH	OS	PG	ML	AK	UID	Daily Total	Obs. Hours
Feb.27					19			1								2	22	4.5
Mar. 1					5												5	3.9
2					3										1		4	4.5
3					11												11	5.8
4					6	1		1									8	5.8
5					126	1		1									128	5.5
6	1				23			1									25	7.
7		1		1	21			1							1		25	6.5
8					15						1					1	17	6.5
9					2			2									4	5.5
10					1												1	4.
11					3												3	.8
12				1	26			4			1						32	6.
13					64										2		66	6.3
14	1				189	3		2								2	197	8.
15				1	46	3					3				1		54	6.
16				1	311	4		1	1						1		319	7.9
17		SNOW & BLOW - NO COVERAGE																
18																	-	4.
19	1				19	2		1								1	24	5.5
20		SNOW & BLOW - NO COVERAGE																
21					20	3									1	1	25	7.8
22	1			7	182	75									3	105	373	7.5
23					37	12		1								4	54	6.5
24	2			3	120	35				1					1	19	181	8.3
25	13	2		3	232	97		1			2				4	40	394	8.1
26	10	1	2	11	41	43		2			4				2	105	218	7.3
27	5		4	1	67	6		1									84	7.7
28	6		7	4	72	28									3	49	169	8.
29	24		14	2	12	25					4				13		94	9.8
30	1		6												2		9	2.7
31	89		74	6	99	106		1			6				16	37	434	9.
TOTAL	154	4	107	41	1772	444		21	1	1	18				51	366	2980	186.4

Date	TV	GO	SS	CH	RT	RS	BW	RL	GE	BE	NH	OS	PG	ML	AK	UID	Daily Total	Obs. Hours
Apr. 1	36		30	1	5	8					3				3	3	89	8.0
2	146		76	13	68	11		3			2				6	11	336	6.8
3	35		82	6	23	8					3				7	6	170	10.6
4	39		49	3	9	2					3	2			10	1	118	5.8
5	6	1	5	1	2										1		16	5.3
6	29		13	4	49	1									2		98	7.8
7	31		258	11	75	9		1			6				2	5	399	8.7
8	40		402	11	40	7					5	1		1	1	3	511	7.5
9	4		27	2	17						1	1					52	7.4
10	26		486	27	35	12	2	2			6					21	619	7.5
11	1	1	17	3	9	2	1	6			2					11	53	5.5
12	10		137	5	5	3	1						1		2	7	171	7.7
13	2		161	7	31	9	18	6	1		7			1	5	1	249	7.6
15	4		9		7	2					1				1	3	27	7.8
16	4		89		8		3				2				3		109	7.7
17	8		28		1		3					2					42	6.4
18	12		10	1	3		4								2	2	34	8.5
19	21	1	297	2	22	1	2199				4	3			5	1	2556	7.8
20	2		6		2		3										13	6.8
21	1		37	1	34	2	27	1			1	1			1	3	109	7.7
22	3		57	1	25		62				1				1	58	208	7.7
24			13	1			2										16	5.4
25			23	3	9		12	10									49	6.1
26	16	1	161	7	38	1	1729				3	1				49	2006	7.5
27	7		216	4	22	1	2120				3	1	1		2	78	2456	9.3
28			138		2		117				2						259	3.3
29	2		103		3		173										281	6.4
30	1		49	1	17		71										139	7.9
Totals	486	4	2979	115	561	79	6547	20	1	0	55	12	2	2	57	265	11,185	202.5
May 1	4		61		18		62				1	2				3	151	8.0
2	1		52		22		44				2						122	6.8
3	12		92	1	22	1	59				1	1	1			1	191	10.6
4			334	3	7		22				2	1					369	8.2
5	3		234	9	32		113				9				1	2	403	7.0
6			6		2		1										9	5.2
7			21	4	96	1	20									5	147	7.2
8			33		19		3										55	8.0
9			46	2	1		1				4					1	55	6.0
12			10									1			1	1	13	7.3
13			16		1		1								1		20	7.5
14	3		11		3		2		1		1						21	5.5
15			2						1								3	4.0
17			10		13		5										28	6.7
18			5	1	8		1					1					16	7.5
19			7	1	8	1	1				3					1	22	7.0
20	1		2		6												9	7.2
21			4				2				1						7	6.9
22					5	1	2										8	7.0
23	1		7				2									1	11	4.5
24	1		14	1	5		1				1						23	6.0
25			3								1						4	7.0
26			2		1	1	4				1				2		11	7.0
27					1												1	4.3
29	3		3				5								1	1	13	7.5
31	2		2		1		1				1						7	3.2
Totals	31	0	1009	22	271	5	357		0	2	0	29	7	1	0	6	16	1758	173.7
Season Total	671	8	4095	179	2604	528	6904	41	4	1	102	19	3	2	114	647	15,923	562.6

NOTE: Omitted dates were not covered because of weather conditions.

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NOTEWORTHY BIRD RECORDS

Number of species recorded to February 14, 1982 - 97

Common Loon	Feb. 3	1	L. Ont. at Brant St.	Denys Gardiner
Great Blue H eron	Jan. 16	1	Oakville waterfront	Denys Gardiner
Lesser Snow Goose	Feb. 14	2	over Southcote	Tim Story
Shelduck	Jan. 25*	1	Spencer Smith Park	Mike Wolfe
	Jan. 27	1	Windermere Basin	B. Jones, J. Olmsted
Pintail	Feb. 6	1	Windermere Basin	Michael Clark
Green-winged Teal	Jan. 23	1	Windermere Basin	Michael Clark
Barrow's Goldeneye	Feb. 2 - 6	1	Desjardins Canal Dundas	Bob Finlayson
Wh ite-wing. Scoter	Jan. 23	47	Port Nelson	Michael Clark
Red-br. Merganser	Jan. 23*	1	Port Nelson	Michael Clark
Goshawk	Jan. 28* on	1	Taquanyah Cons. Area	Bruce Dunca n
	Feb. 14 1 imm.		North Shore Blvd.	Dave & Thelma Powell
Sharp-shinned Hawk	Jan. 24* on	1	Taquanyah Cons Area	Bruce Duncan
Cooper's H awk	Feb. 2* on	1	Taquanyah Cons. Area	Bruce Duncan
Marsh H awk	all Jan.	2	Taquanyah Cons. Area	Bruce Duncan
Ring-n. Pheasant	Jan. 23*	2	East end of Bay	Michael Clark
Long-eared Owl	Jan. 25	1	Spencer Ck at Marsh	Bob Finlayson
Short-eared Owl	Jan. 15	8	Fisherville	Bruce Duncan
Saw-whet Owl	Jan. 26*	1	W of University Landing	Bob Finlayson
Y ellow-sh. Flicker	Feb. 8	1	Caledonia	Bruce Duncan
Red-bellied Wdpkr.	all Jan.	1	NW of Cay uga	Bruce Duncan
Yellow-b. Sapsucker	Feb. 6*	1	Dundas Marsh willows	Michael Clark
Horned Lark	Jan. 14*	60	York, Ont.	Bruce Duncan
	Jan. 23	60	Brock Road	Tom & Anne Reid
Red-br. Nuthatch	Jan. 2*	5	Sulphur Springs	James A. N. Dowall
Winter Wren	Jan. 1*	1	Spencer Ck at Marsh	Jim Dowall
N. Mockingbird	Jan. 23	1	Bronte	Michael Clark
American Robin	Feb. 2; 8	2, 1	Westdale; Burlington	Finlayson; L. North
Varied Thrush	Jan. 23*	1	Old Waterdown Road	Misses Leslie & Schwenger
	Feb. 6 - 8	1	2 Mayfair Ct Dundas	Barbara Reid
Northern Shrike	Jan. 1*	1	Sprncer Ck at Marsh	Jim Dowall
	Jan. 16	1	Burloak Drive	Denys Gardiner
	Feb. 1	1	Grimsby	Jack McInally
E. Meadowlark	Jan. 24*	2	O River Rd W of Cayuga	Bruce Duncan
Red-w. Blackbird	Jan. 19*	1	Treeland Burlington	Adam Harrington
Rusty Blackbird	Dec. 6	20	River Rd w of Cayuga	Bruce Duncan
Brown-h. Cowbird	Feb. 3	6	Cedar Av Burlington	Ruth Summers
Dickcissel	Jan. 11* 1 male	112	1st St N, St. Ck.	Rob & Susan Waldhuber
Purple Finch	Jan. 23	1	H wy. 8 above Dundas	Tom & Anne Reid
H ouse Finch	Jan. 16	1	Mountain Avenu e	Charles DeFalco
	Feb. 1	4	857 Eagle Dr., Buel.	Laurel North
Hoary Redpoll	Feb. 1*-7	2	27 Skyline Dr. Dundas	Michael Clark
Common Redpoll	Jan. 15	30	3 mi. NW of Cayuga	Bruce Duncan
White-winged	Jan. 22	15	Hey. 8 above Dundas	Tom & Anne Reid
Crossbill	Feb. 6	2	North Shore Blvd.	Dave & Thelma Powell
Oregon Junco	Jan. 23*	1	H olyrood Rd Oakville	Denys Gardiner
White-crowned Sp.	Jan. 15*	1	Conc. 5, Waterdown	Harold Lang
Lapland Longspur	Jan. 14 *	2	York, Ont.	Bruce Duncan
Snow Bunting	Jan. 25	150	Brock Road	Tom & Anne Reid

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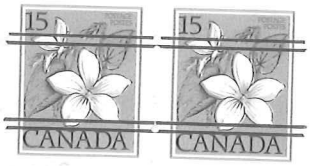

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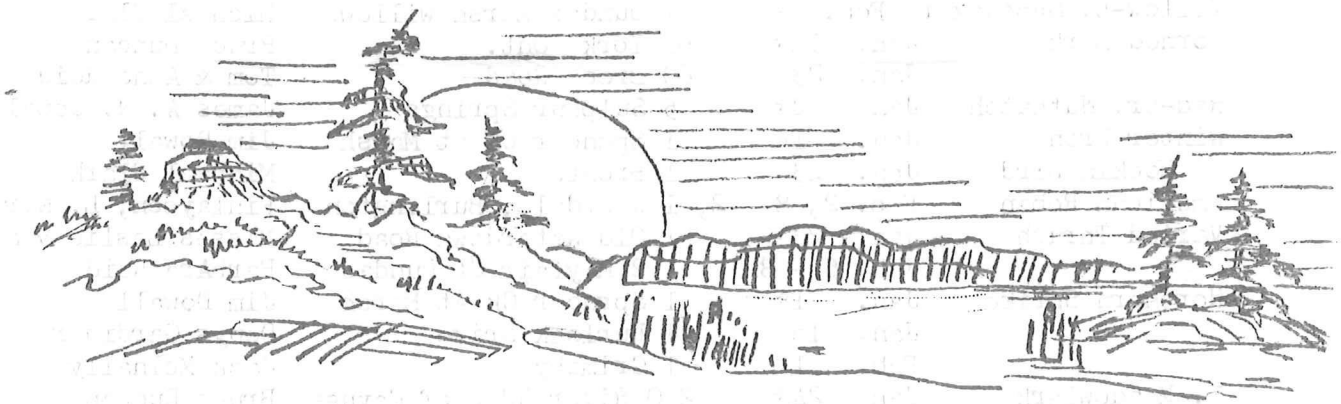

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